

Flying Qualities Metrics and Design Guidelines for Modern Transport Aircraft, Phase I

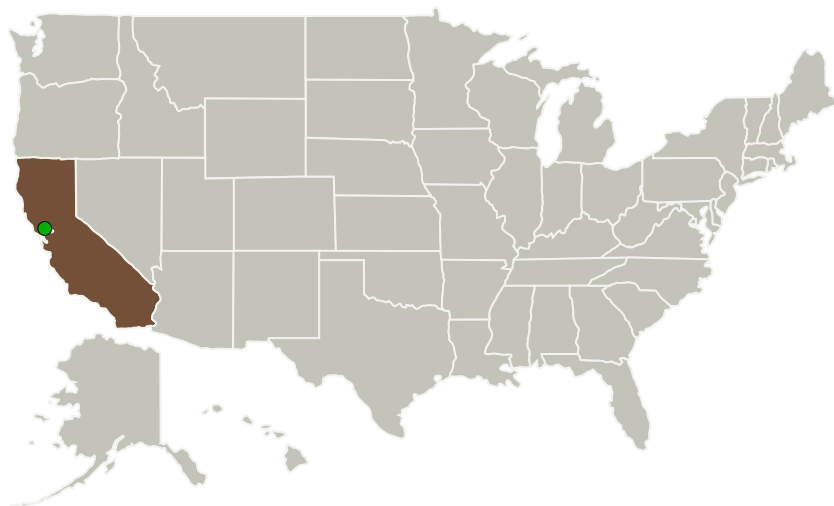
Completed Technology Project (2010 - 2010)



Project Introduction

Current and planned transport aircraft designs are making more use of fly-by-wire technology, allowing an unprecedented design space for control laws, including adaptive control concepts, and resulting response-types. The resulting higher order responses do not lend themselves well to the modal flying qualities requirements that were developed more than four decades ago for conventional aircraft response-types. Furthermore, this expanded design space also makes it possible to implement flight control systems that can lead to unintended degraded flying qualities and undesirable pilot-vehicle interactions. The transport aircraft control system design engineer needs to have tools in the form of modern flying qualities metrics to help determine the permissible thresholds of control while still suppressing undesirable dynamic responses. To address this need Systems Technology, Inc. (STI) proposes to develop the TRansport Aircraft Design Elements - Flying Qualities (TRADE-FQ) toolbox that will feature modern requirements validated from a new flight test database, built-in data reduction tools, and expert system guidance. In Phase 1 critical requirements areas will be identified and explored via piloted simulation to demonstrate feasibility of the proposed approach. Candidate requirements will then be evaluated via a formal flight test program to be conducted in Phase 2 with the Calspan Learjet in-flight simulator.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Systems Technology, Inc	Lead Organization	Industry	
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations

California

Project Transitions

**January 2010:** Project Start**July 2010:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/139015>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Systems Technology, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

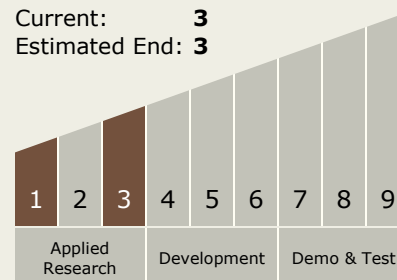
Carlos Torrez

Principal Investigator:

David H Klyde

Technology Maturity (TRL)

Start: **1**
 Current: **3**
 Estimated End: **3**



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Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
 - └ TX17.5 GN&C Systems Engineering Technologies
 - └ TX17.5.8 Flying/Handling Qualities

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System